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608.01(n)(I)(A) for examples of acceptable multiple dependent claim wording. Accordingly, the Examiner is requested to remove the objection to claim 14.

Claims 1-4 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Mihara (JP 405303076) in view of Okada et al. (USP 4,800,382; hereafter “Okada”).

Claims 7 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mihara in view of Okada and Surguy (USP 5,233,338). Claims 10, 11 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. (USP 6,172,662; hereafter “Ito”). Claims 13 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ito in view of Surguy.

Applicant respectfully traverses the prior art rejections.

Claims 1-4 and 7-9

Independent claim 1 is directed to “[a] method for driving a liquid crystal display apparatus.” Claim 1 requires:

scanning successively a plurality of scan lines in a first field of a frame for display;

simultaneously resetting the scan lines in the first field after the scan lines are successively scanned in the first field;

scanning successively the scan lines in a second field of the frame for display in an order reverse to that in the first field; and

simultaneously resetting the scan lines in the second field after the scan lines are successively scanned in the second field.

An exemplary embodiment of the method of claim 1 is illustrated in Figure 10 of the present application.

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With regard to independent claim 1, the Examiner concedes that Mihara does not disclose “simultaneously resetting the scan lines in the first [and second] field[s] after the scan lines are successively scanned in the first and second fields”. However, the Examiner asserts Okada (Figure 6) discloses simultaneously erasing the scan lines. The Examiner further asserts that “it would have been obvious to ... allow the erasure step, as taught by Okada, in a driving method similar to that which is taught by Mihara, in order to reduce flickers in the display device.”

In the Amendment filed June 16, 2004, Applicant argued that independent claim 1 would not have been rendered obvious in view of Mihara and Okada because one of ordinary skill in the art would not have been motivated to modify the driving method of Mihara based on the teachings of Okada to produce the claimed invention. In particular, as shown in Figure 4, Mihara discloses applying a negative pulse $-V_2$ (erasing in black) and then applying a positive pulse V_1 (write in white) to each successive scan line in a field of frame. As shown in Figure 6, Okada discloses simultaneously erasing the scan lines by applying a negative pulse $-2V_0$ (i.e., erasing in black) and then successively scanning the scan lines by applying a positive pulse $2V_0$. Accordingly, both Mihara and Okada teach that for each field, the scan lines are reset prior to scanning. On the other hand, the claimed invention requires simultaneously resetting the scan lines in a field after the scan lines are successively scanned in the field.

In response to the arguments for patentability, the Examiner maintains that:

Okada teaches that the scan lines are reset before the scan lines are scanned. Which thereby provides a reset period after the lines are scanned, these lines being the lines from the previous scan line. Thereby

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the reset period of Okada would be at the end of the sub-frame as opposed to the beginning of the sub-frame.¹

However, Applicant respectfully submits that the Examiner reasoning is improper since Okada does not teach or suggest that the reset period is at the end of the sub-frame. Instead, Okada teaches that the reset period is in the beginning of the subframe. For example, as discussed at col. 5, lines 59-63, Okada states that “all or a part of the picture elements on the whole picture written in the previous field or frame is erased (written in "black") at the same time and then successively written (in "white").” Thus, since Okada clearly teaches the picture elements are erased at the beginning of each field or frame, the cited reference fails to provide the requisite motivation for modifying the teachings of Mihara to simultaneous erase the scan lines after the scan lines are scanned and in the same frame in which the scan lines are scanned.

The Examiner further cites Tsuboyama et al. and Channin for “teaching a reset signal following the scan line signal.” Although these references were not made part of the rejection of record, Applicant notes that neither reference discloses scanning the scan lines in a field and then simultaneously resetting the scan lines in the field. Moreover, there must be some suggestion or motivation to modify or combine the reference teachings to establish a *prima facie* case of obviousness under 35 U.S.C. § 103.²

¹ November 29, 2004 Office Action at page 9.

² “To support the conclusion that the claimed invention is directed to obvious subject matter, either references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the reference.” *Ex parte Clapp* 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

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In view of the above, Applicant respectfully submits that independent claim 1, as well as dependent claims 2-4 and 7-9, should be allowable because Mihara and Okada, alone or in combination, do not teach or suggest all of the features of the claimed invention, and one of ordinary skill in the art would not have been motivated to combine and modify the teachings of the cited references to produce the claimed invention.

Claims 10-15

Independent claim 10 is directed to “[a] method for driving a liquid crystal display element forming a scan line in a frame composed of a first field and a second field.” Claim 10 requires:

writing data a plurality of times in the scan line in the first field by use of a data signal having a period corresponding to the frame, wherein the data signal has a first signal voltage during the first field; and
writing data a plurality of times in the scan line in the second field by use of the data signal having the period corresponding to the frame, wherein the data signal has a second signal voltage during the second field and a polarity of the first signal voltage is opposite to a polarity of the second signal voltage.

An exemplary embodiment of the method of claim 10 is illustrated in Figures 24 and 25 of the present application.

In the June 16, 2004 Amendment, Applicant argued that the claim 10 would not have been rendered obvious in view of Ito because the cited reference does not teach or suggest a data signal having a period corresponding to the frame and the polarities of the data signal voltage are opposite in the first the first and second fields, as claimed. Instead, as shown in Figure 4 of Ito, the data signal applied to the data line Y1 becomes alternately positive and negative a plurality of times during each of the fields 1f-4f.

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In response to the arguments for patentability, the Examiner asserts that “[Ito] teaches a first and second data signal having a period corresponding to the frame wherein the data signal has a first signal voltage during the first field and the second signal voltage during the second field and the first signal voltage is opposite to the polarity of the second signal voltage.”³

However, Applicant respectfully submits that it is quite clear that the period of Ito’s data signal Y1 does not correspond to the frame. Instead, the period of the data signal Y1 is a fraction of the length of the fields 1f, 2f, 3f and 4f of the frame 1F (i.e., the data signal Y1 changes polarity a plurality of times during each field of the frame). Further, the period of the data signal Y1 is greater than the length of the divided sub-selection periods (s1, s2, s3, ...) and greater than the length of the sub-selection periods (t11, t12, t21, t22, ...).

Further, Applicant respectfully submits that the Examiner has misconstrued the teachings of Ito at page 7 of the Office Action. In particular, the Examiner states that:

Even though Ito et al. teaches in the embodiment described in Figures 4 and 5, data is written a plurality of times (s3, s4) in the second field (t21) by usage of a predetermined voltage with the same polarity as that in the first field (t11), it is also further taught that the reversal period is not limited to one frame and it is possible to reverse the polarity for one field at a time, several fields, or several frames at a time (see column 12, lines 60-68). This is also explained with reference to the eighth embodiment explained with reference to Figure 9 (see column 15, lines 51-54).

However, the “reversal period” and “polarity of the voltage applied to the display elements” to which Ito refers is that of the selection/scanning signals X1-X8, not the data signal Y1.

In addition, Ito fails to teach or suggest that the data signal Y1 has a first signal voltage

³ November 29, 2004 Office Action at page 10.

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during the first field and a second signal voltage during the second field, wherein a polarity of the first signal voltage is opposite to a polarity of the second signal voltage, as claimed. Instead, the same voltage waveform having the same polarity is applied during each of the fields 1f-4f.

Accordingly, Appellant respectfully submits that independent claim 10 should be allowable because the applied reference does not teach or suggest all of the features of the claimed invention.

Independent claim 11 is directed to “[a] method for driving a liquid crystal display element forming a scan line.” Claim 11 requires:

writing data a plurality of times in a frame by applying to a data line of the liquid crystal display element a signal voltage having a polarity which becomes alternately positive and negative a plurality of times during the frame at a predetermined frequency, wherein the data is written each time the polarity of the signal voltage is positive and each time the polarity of the signal voltage is negative.

An exemplary embodiment of the method of claim 11 is illustrated in Figures 26 and 27 of the present application.

In the June 16, 2004 Amendment, Applicant argued that the claim 11 would not have been rendered obvious in view of Ito because the cited reference does not teach or suggest applying a signal voltage to a data line data of the liquid crystal element, wherein data written each time the polarity of the signal voltage is positive and each time the polarity of the signal voltage is negative, as claimed. Although the polarity of the signal voltage applied to the data line (Y1) changes a plurality of times during the frame, Ito teaches that data is written only once per field.

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In response to the arguments for patentability, the Examiner simply asserts that “Ito teaches the plurality of write as explained above and data is written when each time the polarity is positive and negative.”⁴ However, Applicant respectfully submits that Ito does not teach or suggest that data is written each time the polarity of the signal voltage applied to the data line Y1 changes. Although the polarity of the signal voltage applied to the data line Y1 changes many times during each of the fields 1f-4f, data is written only once per field in any given scan line.

Similar to claim 10, Applicant also respectfully submits that the Examiner has misconstrued the teachings of Ito in rejecting claim 11. In particular, the Examiner asserts that:

[i]n view of the teachings disclosing that it is possible to reverse the polarity for one field at a time, it would be possible for one frame (F) containing a plurality of fields (t1 1-t41) to have a reversal of polarity every field, which reads on the limitations of claim 11, wherein data is written a plurality of times by use of a signal voltage having a polarity which becomes alternately positive and negative a plurality of times during the one frame (F).⁵

However, the “reversal period” and “polarity of the voltage applied to the display elements” to which Ito refers is that of the voltage applied to the selection/scanning signals X1-X8, not the data line Y1.

Accordingly, Appellant respectfully submits that independent claim 11 should be allowable because the applied reference does not teach or suggest all of the features of the claimed invention. Similarly, dependent claims 12-15 should be allowable at least by virtue of their dependency on claims 10 and 11.

⁴ November 29, 2004 Office Action at page 10.

⁵ November 29, 2004 Office Action at page 7.

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In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: February 28, 2005

Attorney Docket No.: Q53397